

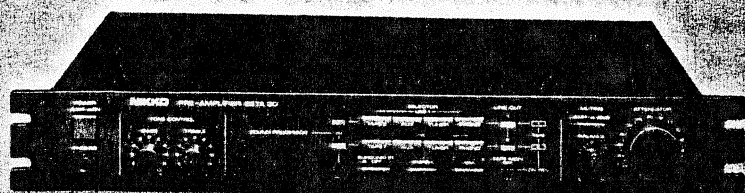
# NIKKO

# PRE-AMP

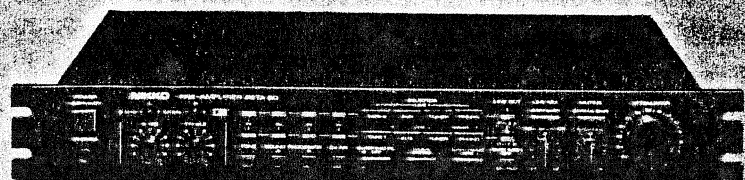
# BETA 30/30s

# BETA 50/50s

## STEREO PREAMPLIFIER



BETA 30



BETA 50

### TYPE AND VOLTAGE

W-TYPE :	UL and CSA type	120V AC
E-TYPE :	NK-STD type	220V AC
V-TYPE :	Multi-Voltage type	110/120/220/240V AC

# SERVICE MANUAL

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# SPECIFICATIONS

## BETA 30

### Preamplifier Section

Total Harmonic Distortion (at 1,000 Hz).

Phono (MC) to Rec Out (at 7 V output):

..... no more than 0.006%

Phono (MM) to Rec Out (at 7 V output):

..... no more than 0.006%

Aux to Pre Out (at 1.8 V output):

..... no more than 0.008%

Input Sensitivity (at 1,000 Hz, 1 V output),

Phono (MC): ..... 0.25 mV  $\pm$  2 dB

Phono (MM): ..... 2.5 mV  $\pm$  2 dB

Tuner: ..... 150 mV  $\pm$  2 dB

Aux: ..... 150 mV  $\pm$  2 dB

Input Impedance (at 1,000 Hz),

Phono (MC): ..... 100  $\pm$  10 ohms

Phono (MM): ..... 47  $\pm$  5 kohms

Tuner: ..... 47  $\pm$  10 kohms

Aux: ..... 47  $\pm$  10 kohms

Tape 1, 2: ..... 47  $\pm$  10 kohms

Signal to Noise Ratio with IHF-A Network,

Phono (MC): ..... more than 62 dB

Phono (MM): ..... more than 82 dB

Tuner: ..... more than 90 dB

Aux: ..... more than 90 dB

Tape 1, 2: ..... more than 90 dB

Frequency Response (20 to 20,000 Hz),

Tuner: ..... +0, -1 dB

Aux: ..... +0, -1 dB

Tape 1, 2: ..... +0, -1 dB

RIAA Equalization Deviation (30 to 15,000 Hz),

Phono (MM) to Rec Out: .....  $\pm$ 1 dB

Tone Control,

Bass (70 Hz): ..... +7, -9 dB

Treble (10 kHz): ..... +7, -9 dB

Muting Delay Time: ..... 4  $\pm$  2 seconds

### General

Power Requirement,

U.S.A. & Canada model: ..... AC 120V/60 Hz

European model: ..... AC 220V/50 Hz

U.K. & Australia model: ..... AC 240V/50 Hz

Power Consumption: ..... 10 watts

Specifications are subject to change without notice.

Dimensions,

Width: ..... 482 mm, 19" (BETA 30)

440 mm, 17-3/8" (BETA 30s)

Height: ..... 70 mm, 2-3/4"

Depth: ..... 258 mm, 10-1/8"

Weight without package: ..... 4.8 kg, 10.6 lbs

## BETA 50

## Preamplifier Section

Total Harmonic Distortion (at 1,000 Hz).

Phono (MC) to Rec Out (at 7 V output):

..... no more than 0.006%

Phono (MM) to Rec Out (at 7 V output):

..... no more than 0.006%

Aux to Pre Out (at 1.8 V output):

..... no more than 0.08%

Input Sensitivity (at 1,000 Hz, 1 V output),

Phono (MC): ..... 0.25 mV  $\pm$  2 dBPhono (MM): ..... 2.5 mV  $\pm$  2 dBTuner: ..... 150 mV  $\pm$  2 dBAux: ..... 150 mV  $\pm$  2 dB

Input Impedance (at 1,000 Hz),

Phono (MC): ..... 100  $\pm$  10 ohmsPhono (MM): ..... 47  $\pm$  5 kohmsTuner: ..... 47  $\pm$  10 kohmsAux: ..... 47  $\pm$  10 kohmsTape 1, 2: ..... 47  $\pm$  10 kohms

Signal to Noise Ratio with IHF-A Network,

Phono (MC): ..... more than 62 dB

Phono (MM): ..... more than 82 dB

Tuner: ..... more than 90 dB

Aux: ..... more than 90 dB

Tape 1, 2: ..... more than 90 dB

Frequency Response (20 to 20,000 Hz),

Tuner: ..... +0, -1 dB

Aux: ..... +0, -1 dB

Tape 1, 2: ..... +0, -1 dB

RIAA Equalization Deviation (30 to 15,000 Hz),

Phono (MM) to Rec Out: .....  $\pm$ 1 dB

Tone Control,

Bass (70 Hz): ..... +7, -9 dB

Treble (10 kHz): ..... +7, -9 dB

CX\*NR Input Level,

Calibration VR Max: ..... 120 mV  $\pm$  2 dBCalibration VR Min: ..... 640 mV  $\pm$  2 dBMuting Delay Time: ..... 4  $\pm$  2 seconds

## General

Power Requirement,

U.S.A. &amp; Canada model: ..... AC 120V/60 Hz

European model: ..... AC 220V/50 Hz

U.K. &amp; Australia model: ..... AC 240V/50 Hz

Power Consumption: ..... 13 watts

Dimensions,

Width: ..... 482 mm, 19" (BETA 50)

440 mm, 17-3/8" (BETA 50s)

Height: ..... 70 mm, 2-3/4"

Depth: ..... 258 mm, 10-1/8"

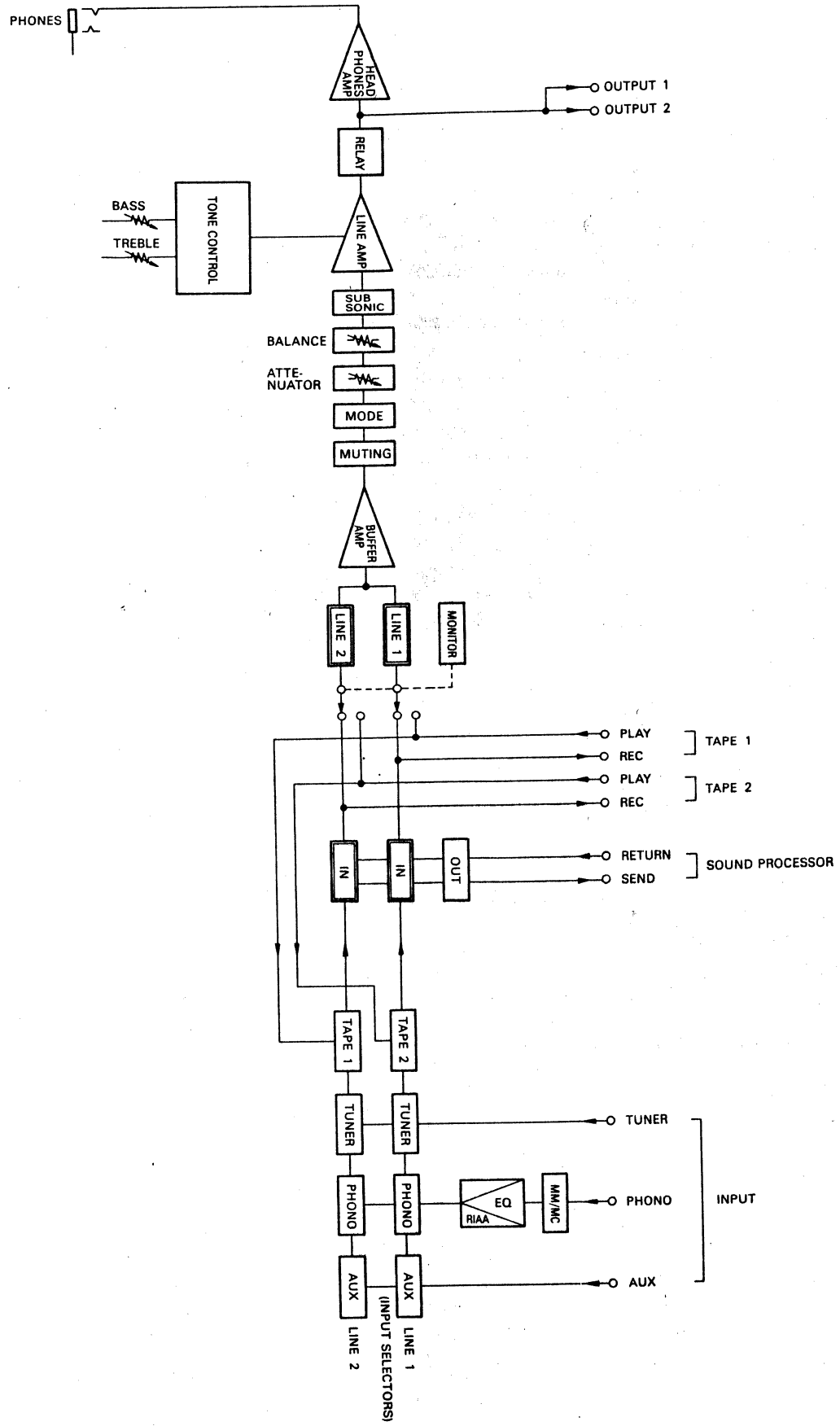
Weight without package: ..... 4.8 kg, 10.6 lbs

Specifications are subject to change without notice.

\* CX is a trademark of CBS Inc.

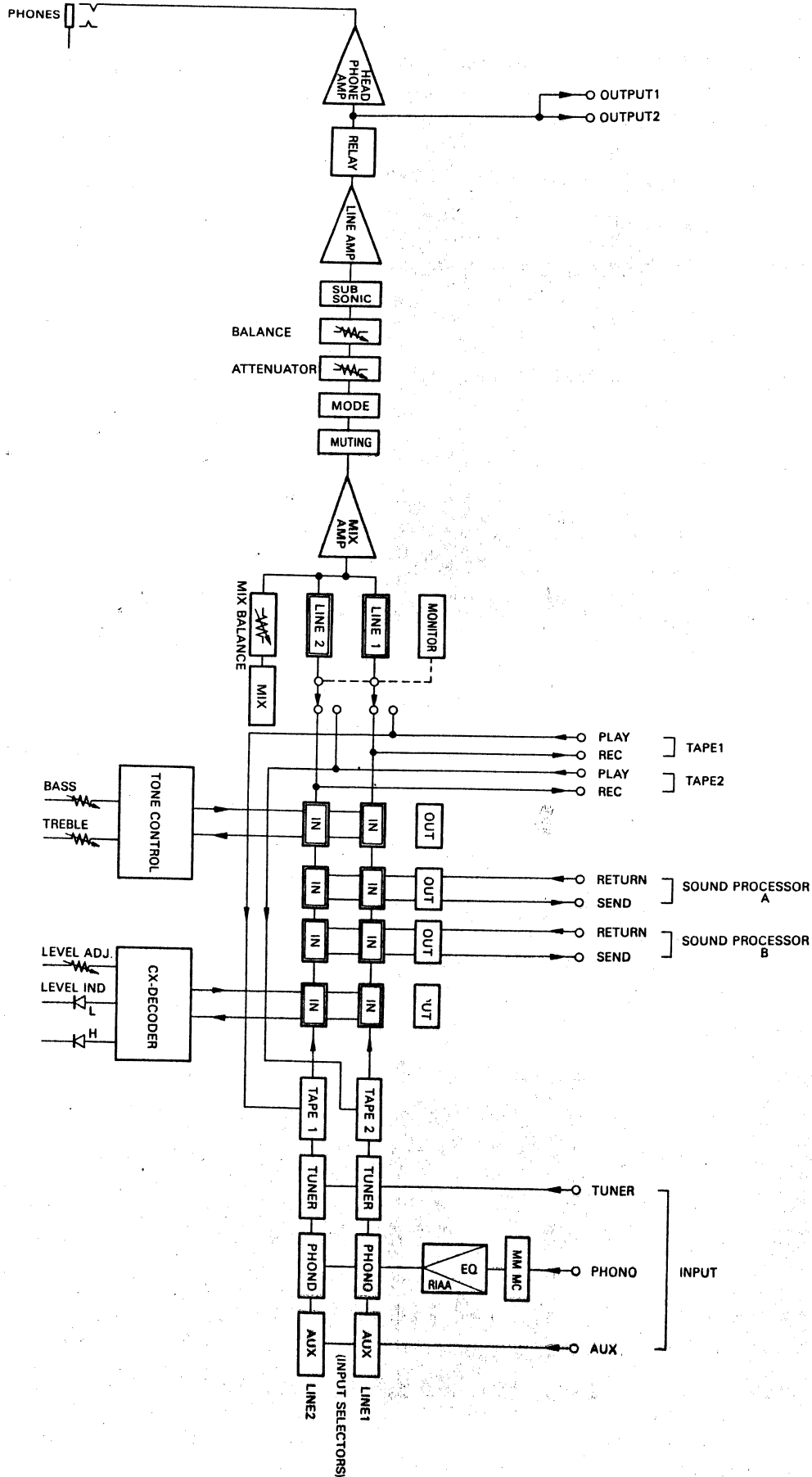
# BLOCK DIAGRAM

BETA 30





BETA 50



## DISASSEMBLY

### 1. CABINET COVER REMOVAL

- Remove four tapping screws from the top of the metal cover.
- Remove four screws from both sides of the metal cover.
- Lift the cabinet cover away from the unit.

### 2. BOTTOM PLATE REMOVAL

- Remove seven tapping screws (#1~7) as shown in Photo 1.

### 3. FRONT PANEL REMOVAL

- Remove two (or one) knobs (#1, 2 Photo 2) from the front panel by pulling them forward.

- Using a hexagonal wrench, remove three knobs (#3 ~ 5) as shown in Photo 2.
- Remove two tapping screws from the top of the unit.
- Remove the front panel from the unit.

### 4. POWER TRANSFORMER REMOVAL

- Disconnect all wires from the power transformer.
- Remove two screws (#1, 2) (Photo 3) from the side plate of the unit.
- Lift the power transformer up and out of chassis.

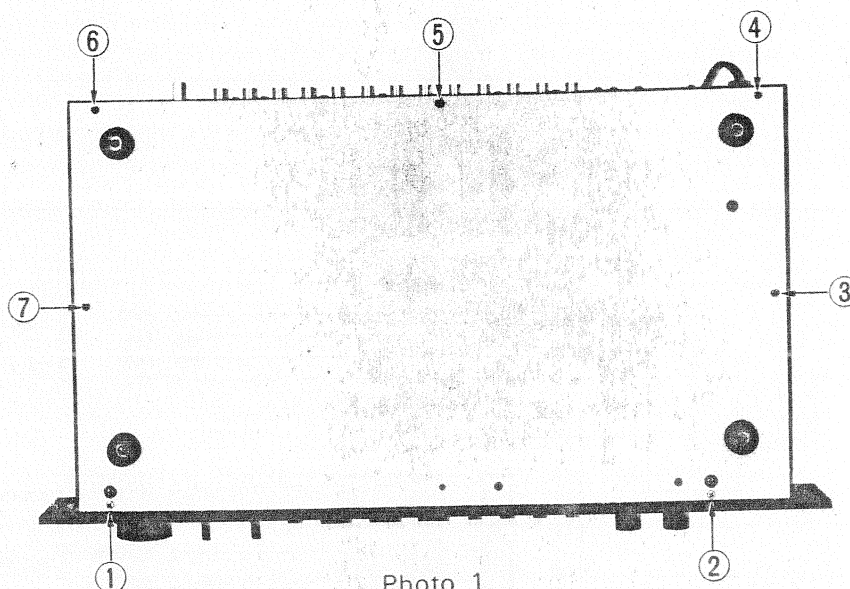


Photo 1

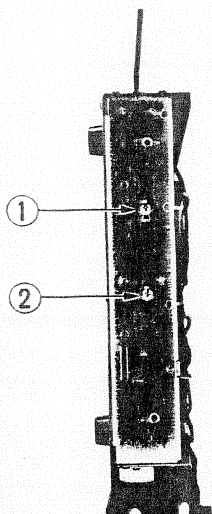


Photo 3

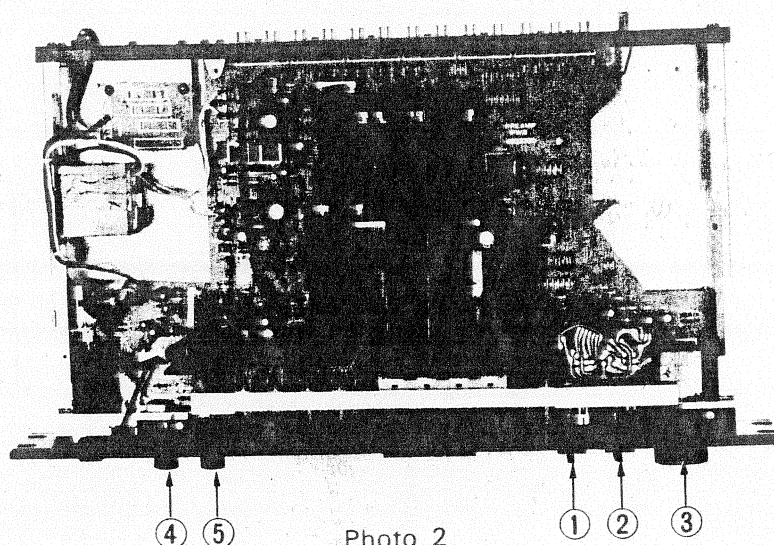


Photo 2

# PARTS LOCATION

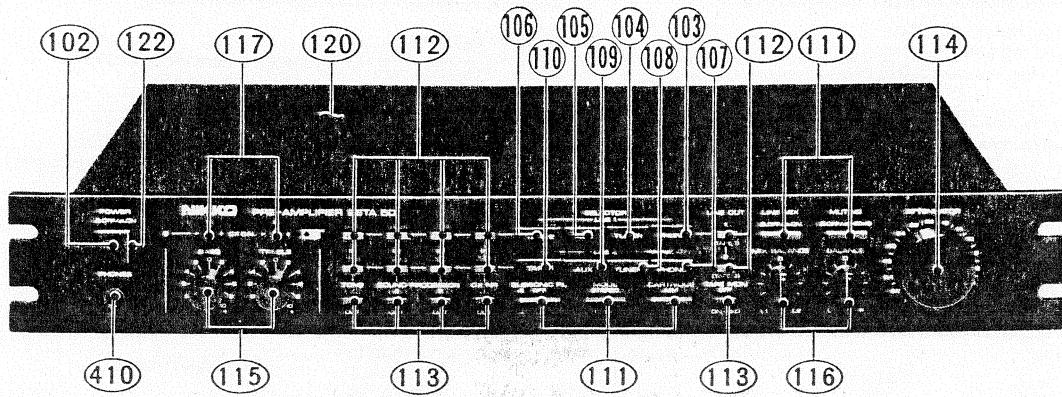


Photo 4

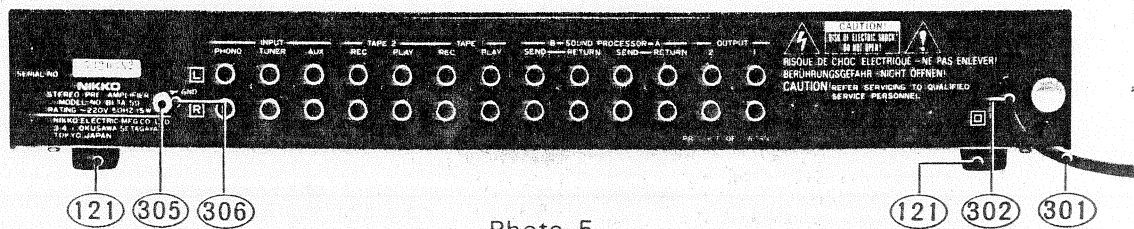


Photo 5

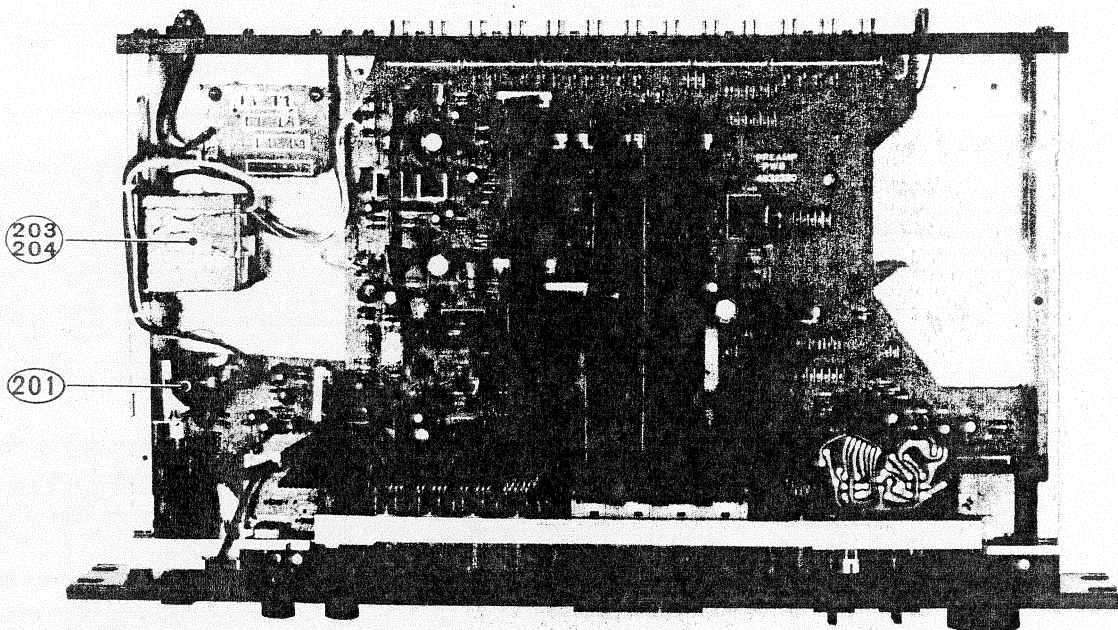


Photo 6

## PARTS LIST

## NOTES:

1. \* The REF. NUMBER (#) marked with a (\*) on parts list is related to number of three digits with a (○). (Photo 4~6).
2. + Numerals in file indicate the quantity of parts used in one type.  
 W : U.S.A. & Canada model, AC 120V  
 E : European model, AC 220V  
 V : Multi-voltage model, AC 110/120/220/240V
3. ++ TR : Transistor  
 FET : Field effect transistor  
 VR : Volume control (Variable resistor)  
 MO-RES : Metal oxide film fixed resistor  
 CEM-RES : Cemented wirewound fixed resistor  
 FP : Flame proof  
 C-CAP : Ceramic capacitor  
 E-CAP : Aluminum electrolytic capacitor  
 M-CAP : Polyester film capacitor  
 S-CAP : Polystyrene film capacitor  
 T-CAP : Tantalum electrolytic capacitor

BP-CAP : Bipolar electrolytic capacitor  
 LC-CAP : Low current leakage electrolytic capacitor

4. Assemblies and parts are subject to change without notice.
5. Parts ordering procedure:  
 A. DO NOT USE THE "REFERENCE" number and "SYMBOL" number. (these are control # for the factory only)  
 B. Include in any order  
 a. Part number. b. Part description. c. Model number.  
 (any of the above lacking from an order may delay shipment of that order.)

## WARNING

⚠ INDICATES SAFETY CRITICAL COMPONENTS.  
 FOR CONTINUED SAFETY, REPLACE SAFETY CRITICAL COMPONENTS ONLY WITH MANUFACTURER'S RECOMMENDED PARTS.

REF. No.	SYMBOL No.	MODEL WE WE 30 30s 50 50s	DESCRIPTION	PART No.
<b>PACKING MATERIALS &amp; ACCESSORIES</b>				
001a	1	---	Carton box - BETA 30	9826740
001b	- 1	---	Carton box - BETA 30s	9826770
001c	- - 1	---	Carton box - BETA 50	9826750
001d	- - - 1	---	Carton box - BETA 50s	9826780
002	2 2 2 2	---	Pad	9841230
003	1 1 1 1	---	Sack, polyethylen cloth	9640720
004a	1	---	Manual, instructions - in English and French - BETA 30	960429E
004b	1 1	---	Manual, instructions - in five different languages - BETA 30/s	960429K
004c	- - 1	---	Manual, instructions - in English and French - BETA 50	960430E
004d	- - 1 1	---	Manual, instructions - in five different languages - BETA 50/s	960430K
005	1 1 1 1	---	Manual, voltage selection - V-type only	960402K
006	1	- 1	Card, warranty - U.S.A. only	967046A
007	1	- 1	List, service stations - U.S.A. only	9690300
008	1 1 1 1	---	Cord, RCA phono pin plug	962026A
009	1 1 1 1	---	Adaptor, AC plug - V-type only	4550230

## CABINET ASSEMBLY

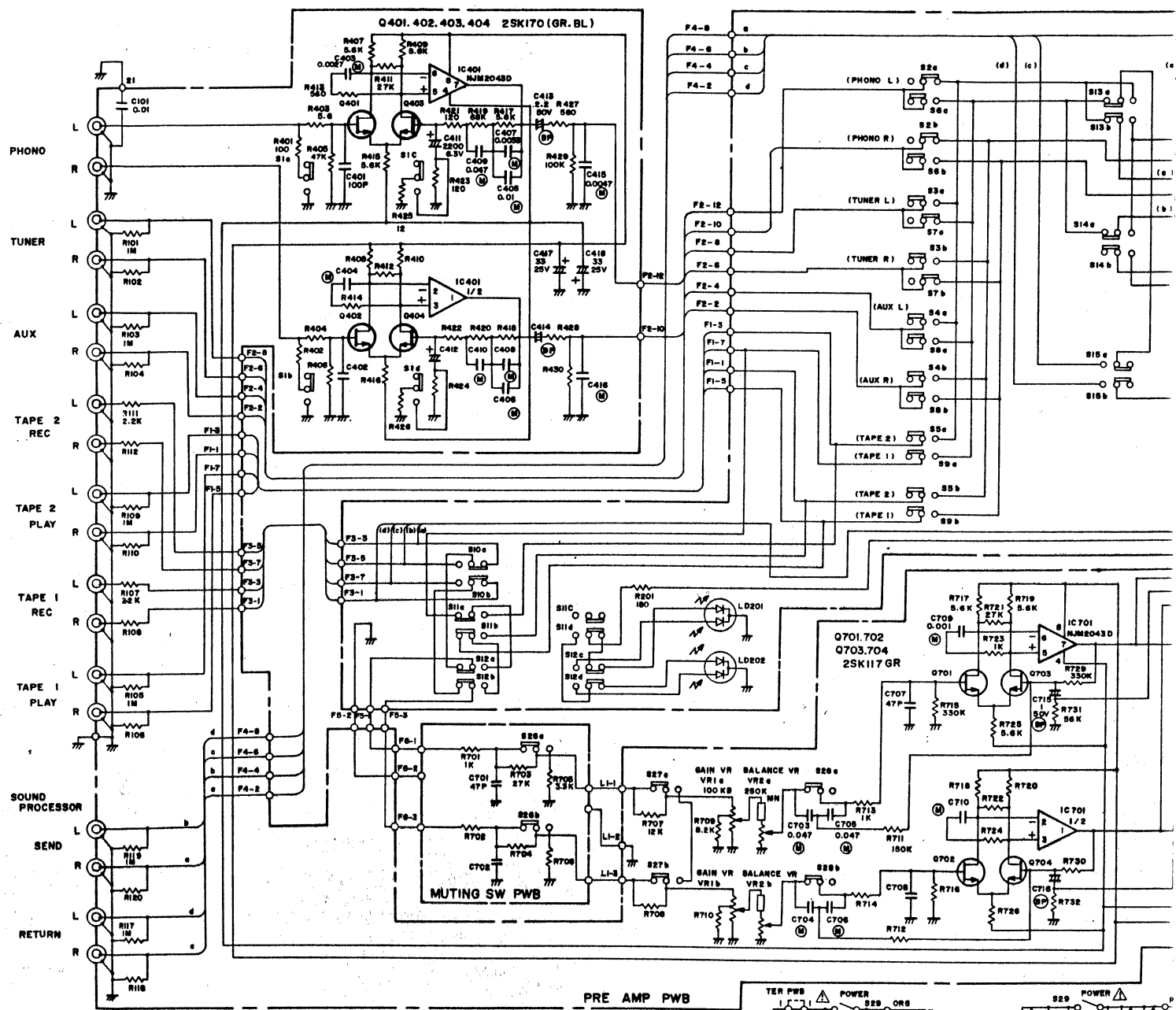
* 101a	1	---	Front panel assembly - BETA 30	7886390
* 101b	- 1	---	Front panel assembly - BETA 30s	7886380
* 101c	- - 1	---	Front panel assembly - BETA 50	7886410
* 101d	- - - 1	---	Front panel assembly - BETA 50s	7886400
* 102a	1	- 1	Button, push - M15SQ-BK - power, BLACK	7852390
* 102b	- 1	- 1	Button, push - M15SQ-SL - power, SILVER	7853930
* 103	1 1 1 1	---	Button, push - P819BK-PHON-1 - phono 1	7853820
* 104	1 1 1 1	---	Button, push - P819BK-TUN-1 - tuner 1	7853830
* 105	1 1 1 1	---	Button, push - P819BK-AUX-1 - aux 1	7853840
* 106	1 1 1 1	---	Button, push - P819BK-TPE-2 - tape 2	7853860
* 107	1 1 1 1	---	Button, push - P819BK-PHON-2 - phono 2	7853870
* 108	1 1 1 1	---	Button, push - P819BK-TUN-2 - tuner 2	7853880
* 109	1 1 1 1	---	Button, push - P819BK-AUX-2 - aux 2	7853890
* 110	1 1 1 1	---	Button, push - P819BK-TPE-1 - tape 1	7853850
* 111a	4	- 5	Button, push - P319W-BK - subsonic/mode/cartridge/muting/(line mix) - BLACK	7853890
* 111b	- 4	- 5	Button, push - P319W-SL - subsonic/mode/cartridge/muting/(line mix) - SILVER	7853700

REF. No.	SYMBOL No.	MODEL WE WE 30 30s 50 50s	DESCRIPTION	PART No.
* 112	4 4 10 10	---	Button, push - P309B-C - others, CLEAR	7853800
* 113	2 2 5 5	---	Button, push - P309B-BK - others, BLACK	7853810
* 114a	1	- 1	Knob - 2BK-34D - attenuator, BLACK	7851740
* 114b	- 1	- 1	Knob - 2SL-34D - attenuator, SILVER	7841880
* 115a	1	- 1	Knob - 30BK-16R - bass/treble, BLACK	7841870
* 115b	- 1	- 1	Knob - 30SL-16R - bass/treble, SILVER	7841860
* 116	1 1 2 2	---	Knob - P2BK-1613DL - balance/ (mix balance)	7852350
* 117a	- 2	-	Knob - 30BK-5.5R - CX cal., BLACK	7841920
* 117b	- - 2	-	Knob - 30SL-5.5R - CX cal., SILVER	7841910
118	1 1 2 2	---	Shaft, extension - 16.5M	7405030
119	3 3 3 3	---	Shaft, extension - 63M	7403450
* 120	1 1 1 1	---	Cover, top	7821510
* 121	4 4 4 4	---	Foot, plastic	7403520
* 122	1 1 1 1	---	Guide, button P15S9BK power switch	7402680

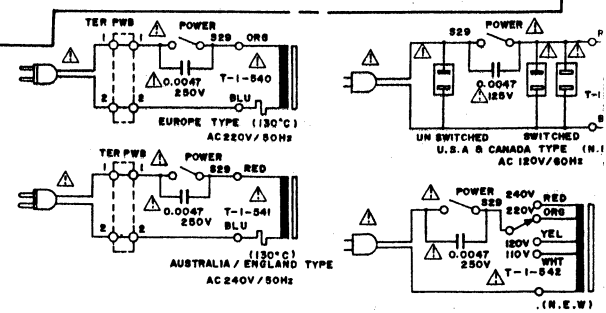
REF. NO.	SYMBOL NO.	TYPE WE V WE V	DESCRIPTION	PART NO.
<b>CHASSIS ASSEMBLY</b>				
* 201a	1	---	Switch, push-power - U.S.A. & Canada type	4042520
* 201b	- 1	---	Switch, push-power other type	4041820
* 202	1 1 1 1 1	---	C-CAP, 0.0047uF	239472A
* 203a	1	---	Transformer, power T-1-539 - AC 120V	1105390
* 203b	- 1	---	Transformer, power T-1-540 - AC 220V	1105400
* 203c	1	---	Transformer, power T-1-542 - AC 110/120/220/240V	1105420
* 204a	1	---	Transformer, power T-1-543 - AC 120V	1105430
* 204b	- 1	---	Transformer, power T-1-544 - AC 220V	1105440
* 204c	1	---	Transformer, power T-1-546 - AC 110/120/220/240V	1105460
<b>BACK PLATE ASSEMBLY</b>				
* 301a	1	---	Cord, power - DP-10 - U.S.A. type	806007A
* 301b	- 1	---	Cord, power - SPT-2 - Canada type	806008A
* 301c	1	---	Cord, power - SEE-2T - Europe type	806010A
* 302a	1	---	Auth. power cord - SP-3P-4 - U.S.A. type & multi-voltage type	7400820
* 302b	- 1	---	Auth. power cord - SP-3P-4 - Canada & Europe type	7400680
* 303a	3	- 4	Socket, AC outlet - U.S.A. type	4500190
* 303b	3	- 4	Socket, AC outlet - Canada type	4500260
* 304	1	---	Button, rotary - AC voltage selector	4530840
* 305	1 1 1 1 1 1	---	Shaft, GND terminal	7152050
* 306	1 1 1 1 1 1	---	Nut, GND terminal	7152060



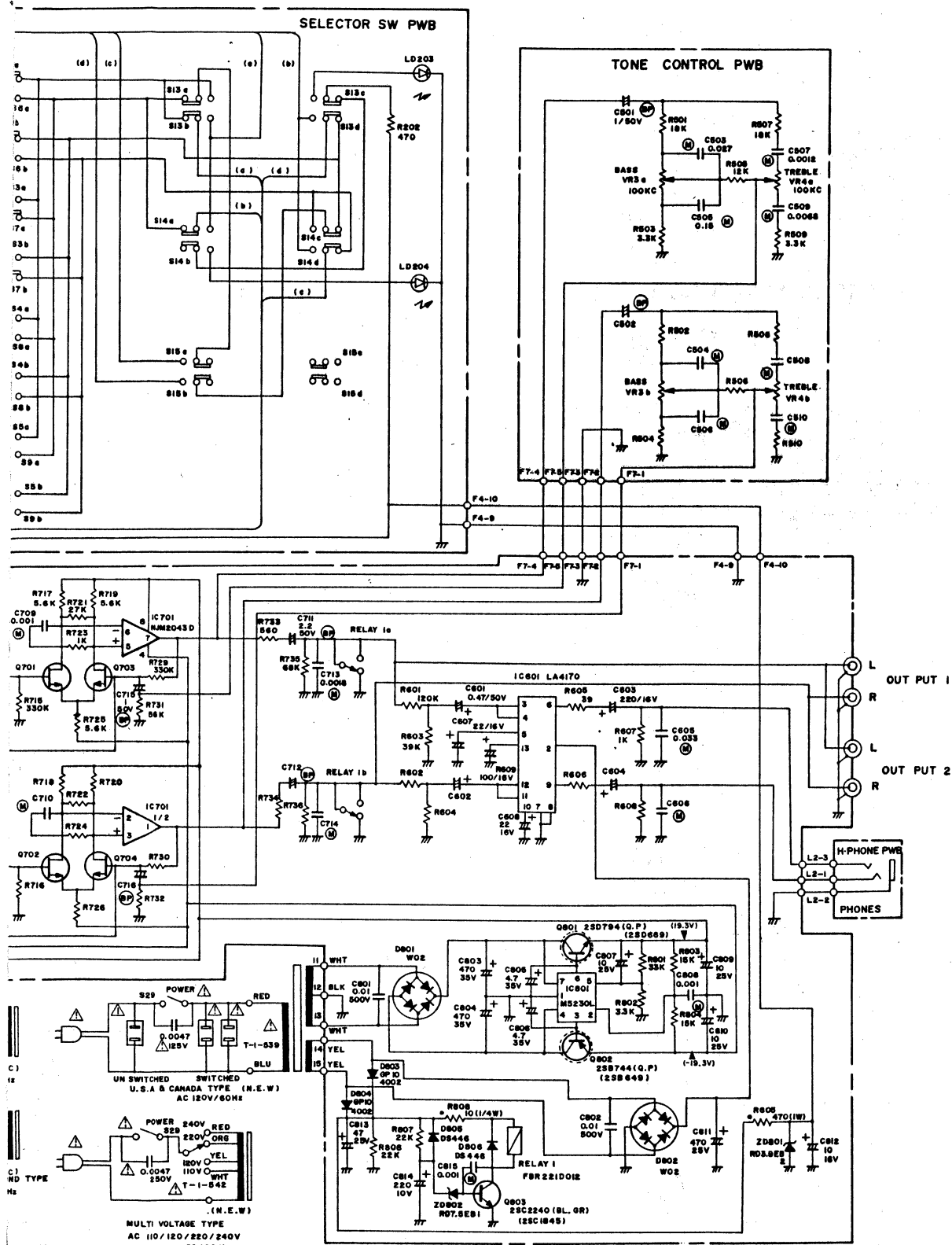
# SCHEMATIC DIAGRAM BETA 30



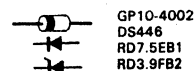
## PRE AMP PWB



- SWITCHES:**
- S1: CARTRIDGE
  - S2: PHONO
  - S3: TUNER
  - S4: (AUX)
  - S5: (TAPE 2)
  - S6: (TAPE 1)
  - S7: (TUNER)
  - S8: (AUX)
  - S9: (TAPE 1)
  - S10: (LINE 1)
  - S11: (LINE 2)
  - S12: TAPE MONITOR
  - S13: (LINE 1)
  - S14: (LINE 2)
  - S15: (OUT)
  - S16: (OUT)
  - S17: MODE
  - S18: SUBSONIC
  - S19: POWER
- SELECTOR LINE 1**  
**SELECTOR LINE 2**  
**LINE OUT**  
**SOUND PROCESSOR**



## SEMICONDUCTORS



**NOTES:**


- UNLESS OTHERWISE SPECIFIED:
2. RESISTANCE VALUES ARE IN OHMS.  
 $K = 1,000; M = 1,000,000$
  3. CAPACITANCE VALUES 1.0 AND ABOVE ARE IN pF OR pF (P=pF, M=μF), LESS THAN 1.0 ARE IN μF. (ELECTROLYTIC CAPACITANCE VALUES ARE IN μF/VVJ)
  4. VOLTAGES ARE MEASURED TO CHASSIS GROUND WITH A "DC VOLTMETER".

**SCHEMATIC SYMBOLS:**

(M) POLYESTER FILM CAPACITOR  
 (NO MARK) CERAMIC CAPACITOR  
 • NONFLAMMABLE RESISTOR

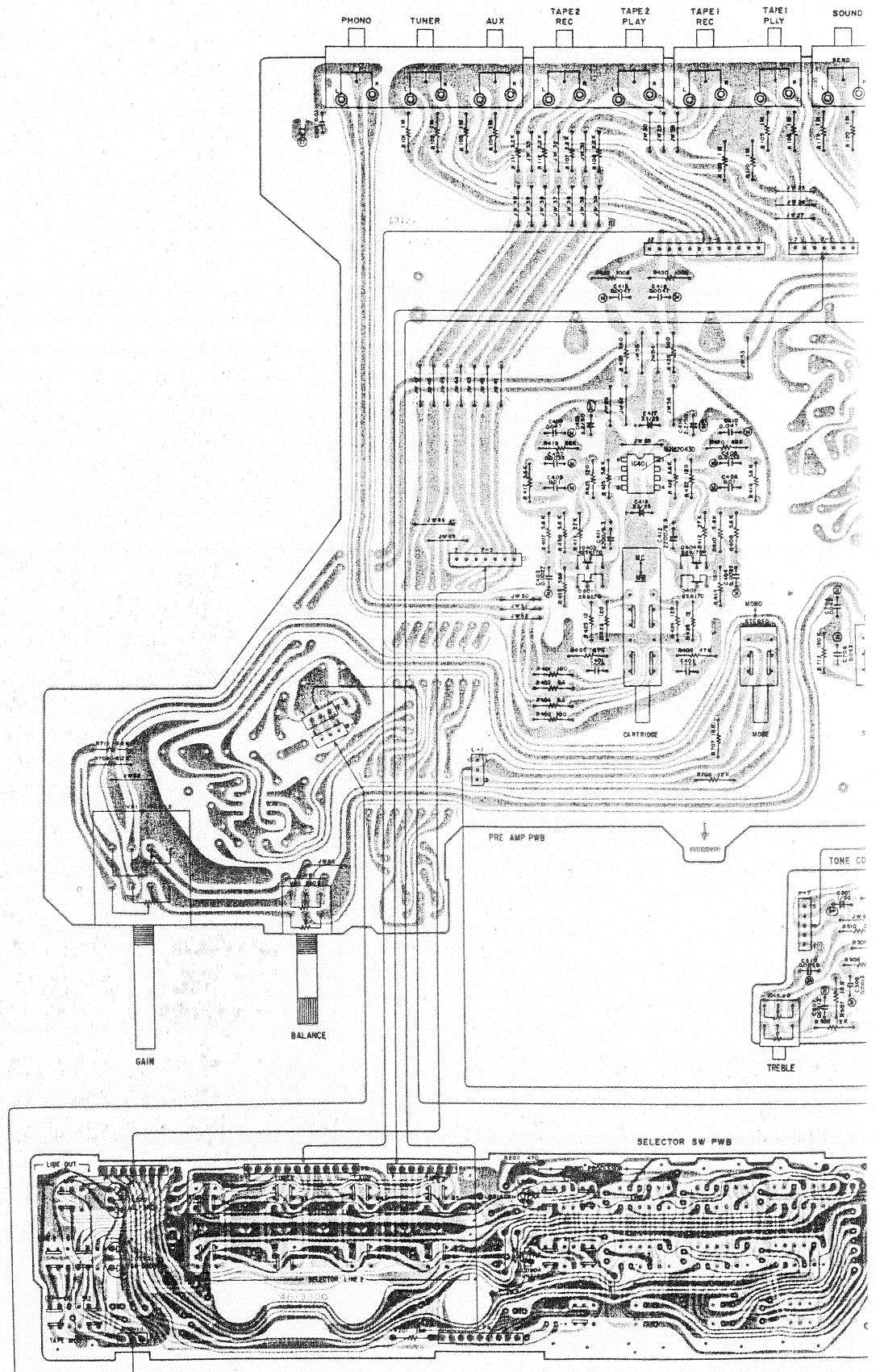
**SERVICE INFORMATION:**

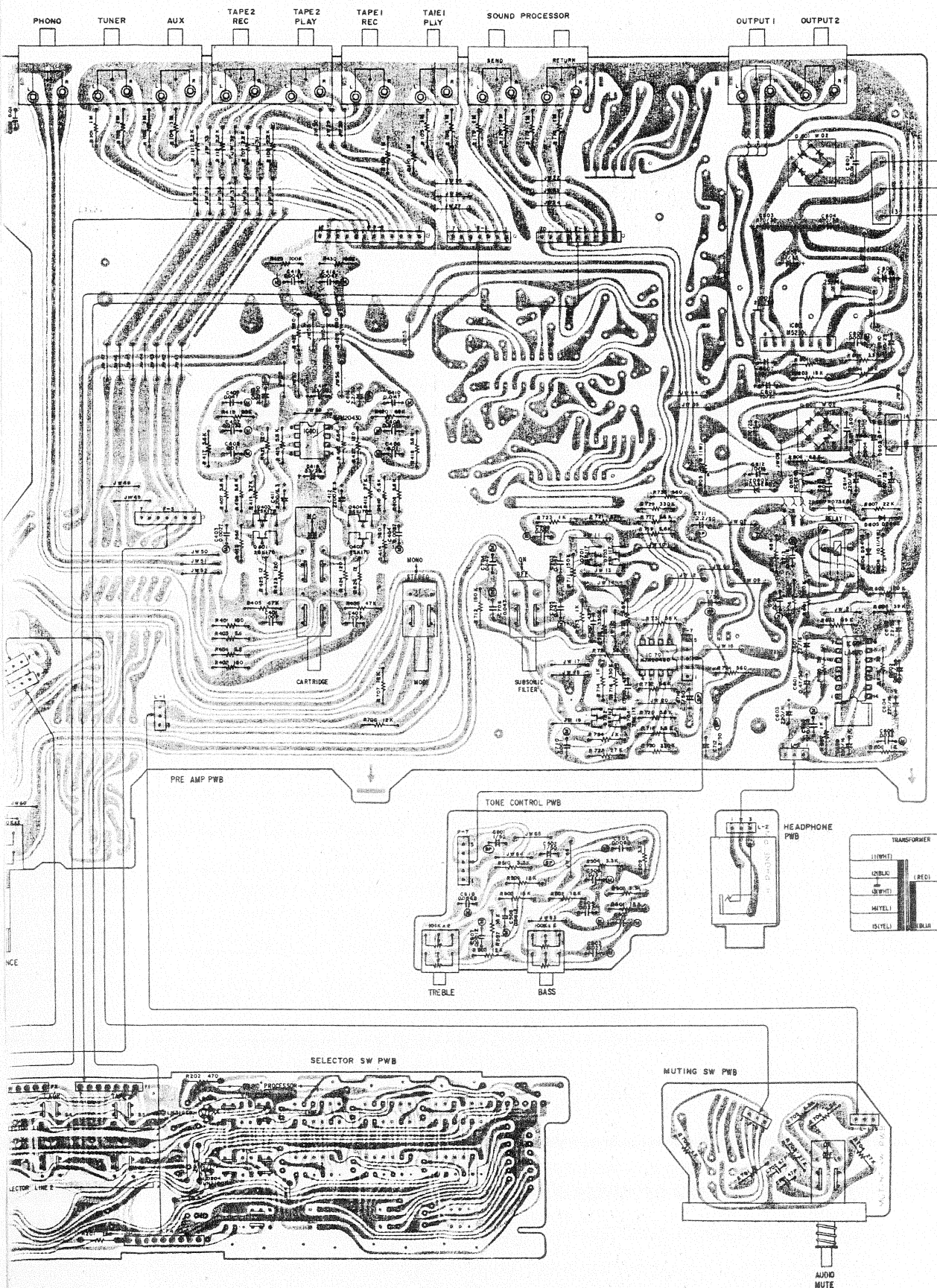
**CAUTION: REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.**

1. EACH PRECAUTION TO BE FOLLOWED DURING SERVICING.
2.  INDICATES SAFETY CRITICAL COMPONENTS FOR CONTINUED SAFETY. REPLACE SAFETY CRITICAL COMPONENTS ONLY WITH MANUFACTURER'S RECOMMENDED PARTS.
3. BEFORE RETURNING THIS APPLIANCE TO THE CUSTOMER, YOU MAKE LEAKAGE-CURRENT OR RESISTANCE MEASUREMENTS TO DETERMINE THAT EXPOSED PARTS ARE ACCEPTABLY INSULATED FROM THE SUPPLY CIRCUIT.

# P. C. BOARD (CONDUCTIVE SIDE VIEW)

BETA 30

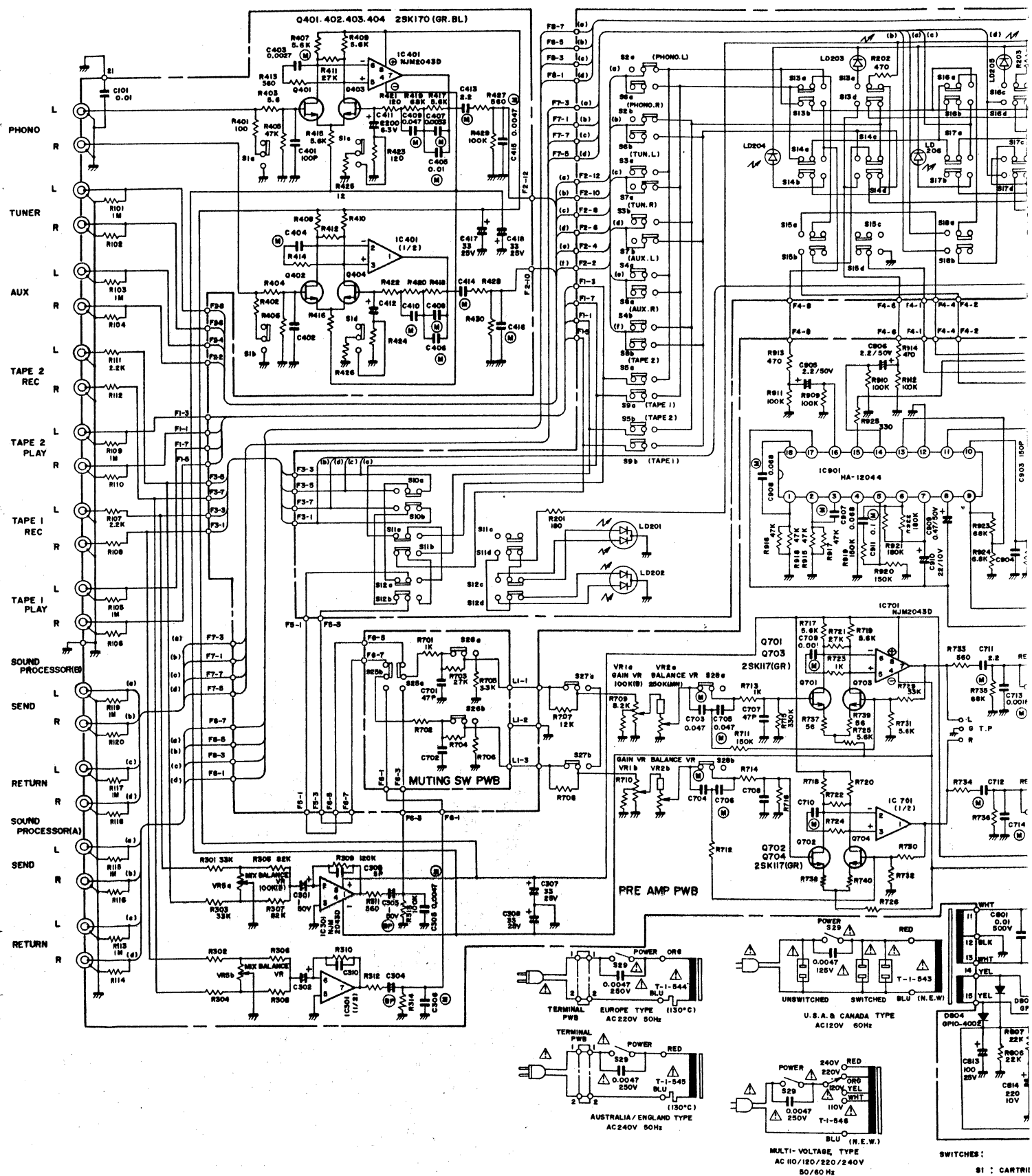




Q, IC	D
	8
802 804	
IC801	
IC401	802 804,
803	Z8004 Z800C B
403, 404 401, 402 701, 703	B
IC501	
IC701	
702, 704	
	LD201, LD203 LD202, LD204
Q, IC	D



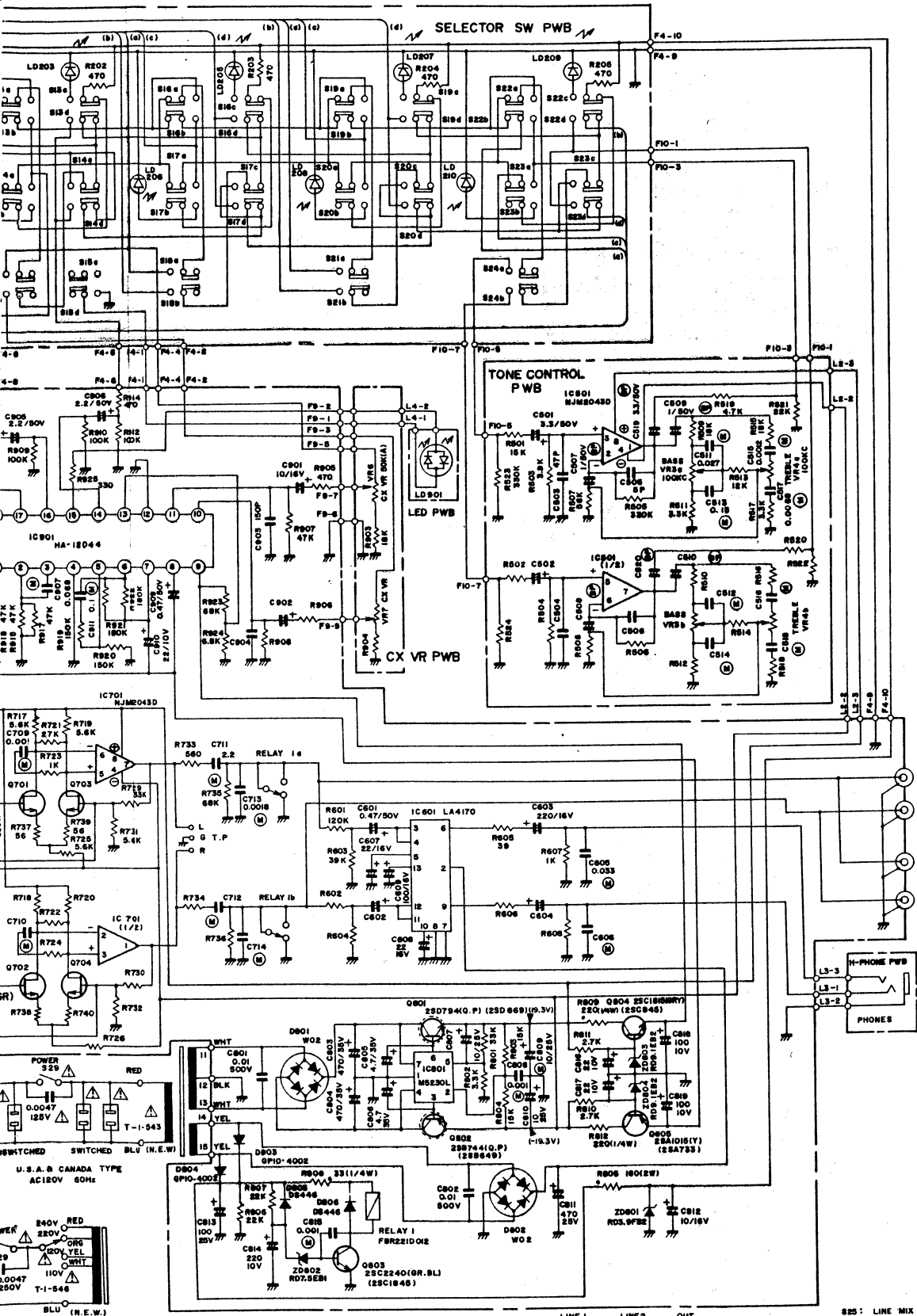
## SCHEMATIC DIAGRAM BETA 50



```

31 : CARTRID
32 (PHONO)
36 (PHONO)
310 (LINE1)
312 : TAPE 1

```



SEMICONDUCTORS	
	2SA1015
	2SC1815
	2SC2240
	2SB744
	2SD794
	2SK117
	2SK170
	GP10-4002
	DS446
	RD7.5EB1
	RD3.9FB2

NOTES:  
1. SCHEMATIC IS SUBJECT TO CHANGE WITHOUT NOTICE.  
2. RESISTANCE VALUES ARE IN OHMS  
K=1,000; M=1,000,000  
3. CAPACITANCE VALUES 1.0 AND ABOVE ARE IN PF OR pF (P=pF, M=μF), LESS THAN 1.0 ARE IN μF (ELECTROLYTHIC CAPACITANCE VALUES ARE IN μF/WV) VOLTAGES ARE MEASURED TO CHASSI GROUND WITH A "DC VOLTMMETER"

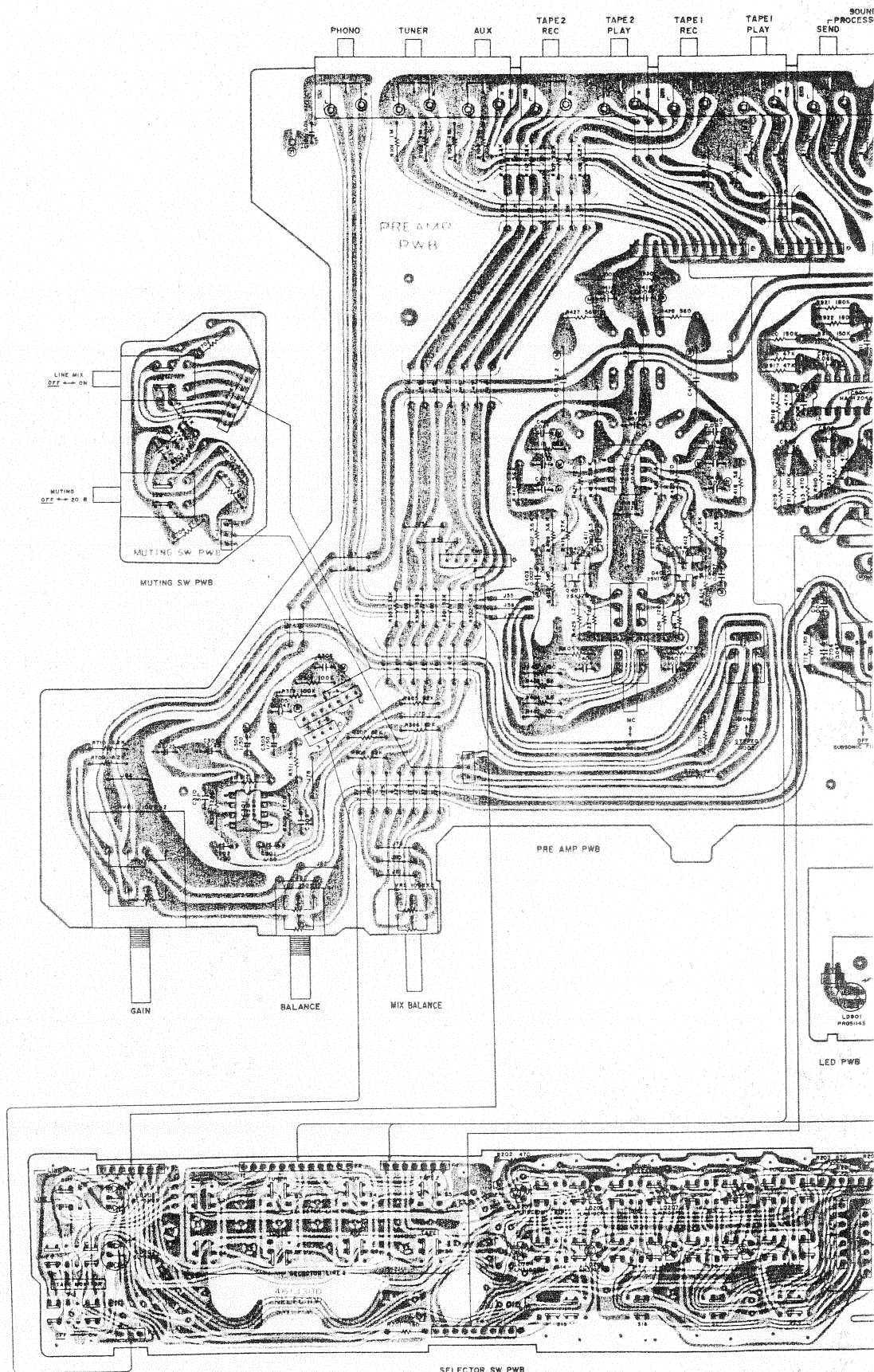
SCHEMATIC SYMBOLS:  
POLYESTER FILM CAPACITOR (NO MARK)  
CERAMIC CAPACITOR  
NONFLAMMABLE RESISTOR

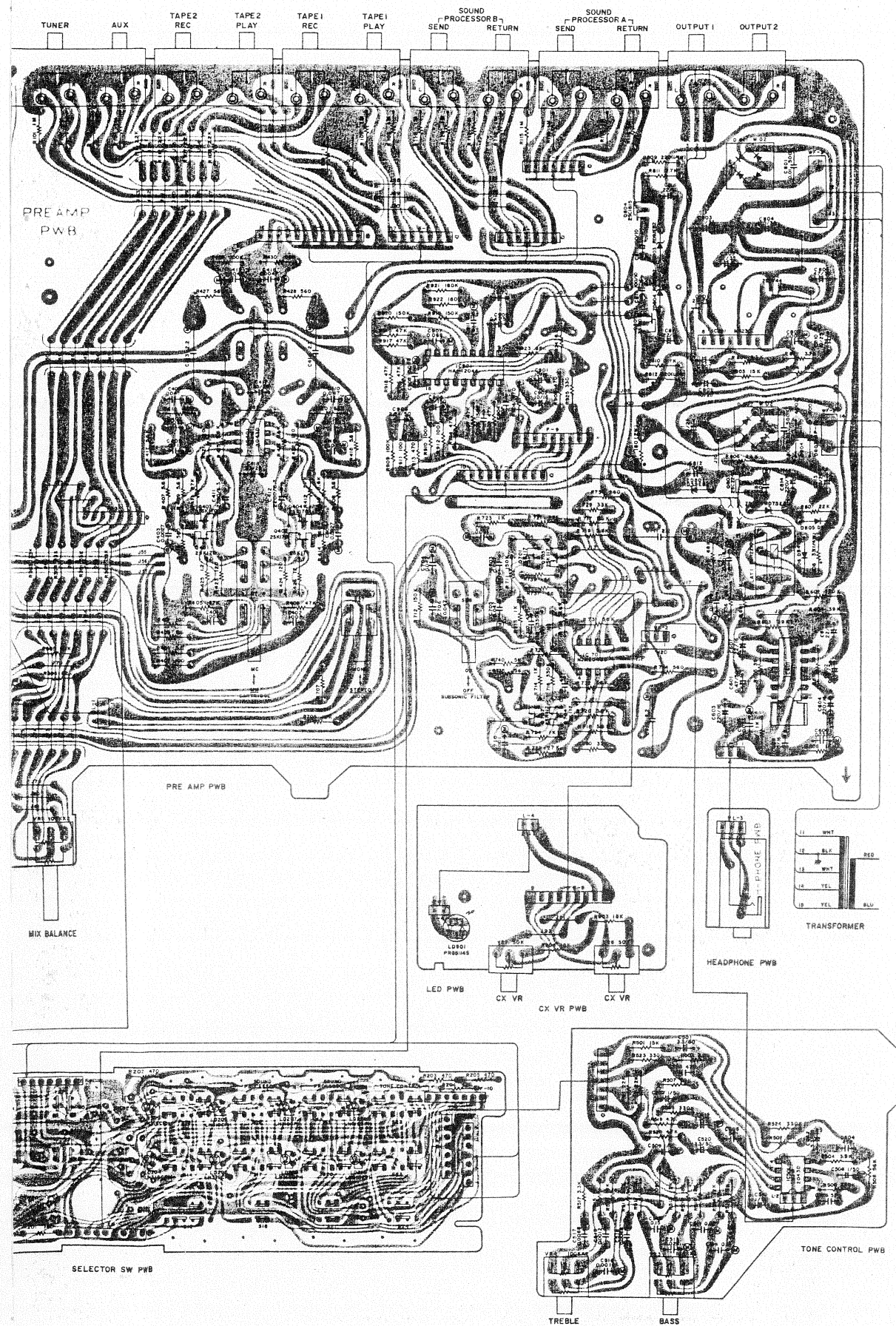
SERVICE INFORMATION:  
CAUTION: REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.  
1. EACH PRECAUTION TO BE FOLLOWED DURING SERVICING.  
2. Δ INDICATES SAFETY CRITICAL COMPONENTS FOR CONTINUED SAFETY. REPLACE SAFETY CRITICAL COMPONENTS ONLY WITH MANUFACTURER'S RECOMMENDED PARTS.  
3. BEFORE RETURNING THIS APPLIANCE TO THE CUSTOMER, YOU MAKE LEAKAGE CURRENT OR RESISTANCE MEASUREMENTS TO DETERMINE THAT EXPOSED PARTS ARE ACCEPTABLY INSULATED FROM THE SUPPLY CIRCUIT.

SWITCHES:  
S1 : CARTRIDGE MM MC  
S2 (PHONO) S3 (TUNER) S4 (AUX) S5 (TAPE2) : SELECTOR LINE1  
S6 (PHONO) S7 (TUNER) S8 (AUX) S9 (TAPE1) : SELECTOR LINE2  
S10 (LINE1) S11 (LINE2) : LINE OUT  
S12 : TAPE MONITOR OFF ON  
S25 : LINE MIX OFF ON  
S26 : MUTE OFF -50dB  
S27 : MODE STEREO MONO  
S28 : SUBSONIC FIL OFF ON  
S29 : POWER OFF ON

**P. C. BOARD (CONDUCTIVE SIDE VIEW)**

**BETA 50**





Q, IC	D	A D J
804	801	
	ZD803	
802	ZD804	
801, 805		
IC801		
IC301		
IC401	802, 804, 805	
803	ZD801	
	ZD802	
403, 404	805	
401, 402	806	
704, 703		
IC701		
IC601		
702, 704		
IC301	VR1, VR2, VR5	
	LD901	
	VR7, VR6	
	LD201 ~ LD210	
IC501		
	VR4, VR3	
Q, IC	D	A D J



PARTS ORDERING PROCEDURE ----- DO NOT USE THE "REFERENCE" number and "SYMBOL" number. (these are control # for the factory only) Include in any order: a. Part number b. Part description c. Model number. (any of the above lacking from an order may delay shipment of that order.)

REF.	SYMBOL	TYPE <sup>+</sup>	DESCRIPTION <sup>++</sup>	PART
No.	No.	W E V		No.
<b>BETA 30/s PREAMPLIFIER PWB ASSEMBLY</b>				
<b>(TONE CONTROL SECTION)</b>				
401	VR3, 4	2 2 2	VR 100kohm (C) x 2 - bass/treble	4321430
	C501,502	2 2 2	BP-CAP 1uf 50V	215510N
	C503,504	2 2 2	M-CAP 0.027uf 5% 50V	222273J
	C505,506	2 2 2	M-CAP 0.15uf 5% 50V	222154J
	C507,508	2 2 2	M-CAP 0.0012uf 5% 50V	222122J
	C509,510	2 2 2	M-CAP 0.0068uf 5% 50V	222682J
	R501,502	2 2 2	RES 18kohm 5% 1/4W	328183J
	R503,504	2 2 2	RES 3.3kohm 5% 1/4W	328332J
	R505,506	2 2 2	RES 12kohm 5% 1/4W	328123J
	R507,508	2 2 2	RES 18kohm 5% 1/4W	328183J
	R509,510	2 2 2	RES 3.3kohm 5% 1/4W	328332J
<b>(TONE AMP SECTION)</b>				
	IC701	1 1 1	IC NJM2043D	518220S
	Q701~704	4 4 4	FET 2SK117 (GR)	516048S
	C707,708	2 2 2	C-CAP 47pf 10% 50V SL	232470K
	C709,710	2 2 2	M-CAP 0.001uf 5% 50V	222102J
	C711,712	2 2 2	BP-CAP 2.2uf 50V	215512N
	C713,714	2 2 2	M-CAP 0.0018uf 5% 50V	222182J
	C715,716	2 2 2	BP-CAP 1uf 50V	215510N
	R713,714	2 2 2	RES 1kohm 5% 1/4W	328102J
	R715,716	2 2 2	RES 330kohm 5% 1/4W	328334J
	R717~720	4 4 4	RES 5.6kohm 5% 1/4W	328562J
	R712,722	2 2 2	RES 27kohm 5% 1/4W	328273J
	R723,724	2 2 2	RES 1kohm 5% 1/4W	328102J
	R725,726	2 2 2	RES 5.6kohm 5% 1/4W	328562J
	R729,730	2 2 2	RES 330kohm 5% 1/4W	328334J
	R731,732	2 2 2	RES 56kohm 5% 1/4W	328563J
	R733,734	2 2 2	RES 560ohm 5% 1/4W	328561J
<b>(PUSH SWITCH SECTION)</b>				
402	S1	1 1 1	Switch, mono push - cartridge selector	4042600
403	S26	1 1 1	Switch, mono push - muting	4042580
405	S27,28	2 2 2	Switch, mono push - mode/subsonic	4042590
<b>(TERMINAL SECTION)</b>				
406		1 1 1	Terminal, RCA phono pin jack - 2P x 3	4446050
407		4 4 4	Terminal, RCA phono pin jack - 2P x 2	4444120
	R101~106	6 6 6	RES 1meg.ohm 5% 1/4W	328105J
	R107,108	2 2 2	RES 2.2kohm 5% 1/4W	328222J
	R109,110	2 2 2	RES 1meg.ohm 5% 1/4W	328105J
	R111,112	2 2 2	RES 2.2kohm 5% 1/4W	328222J
<b>(EQ AMP SECTION)</b>				
	IC401	1 1 1	IC NJM2043D	518220S
	Q401~404	4 4 4	FET 2SK170 (GR or BL)	516039S
	C101	1 1 1	C-CAP 0.01uf +80, -20% 50V YG	231103Z
	C401,402	2 2 2	C-CAP 100pf 10% 50V SL	232101K
	C403,404	2 2 2	M-CAP 0.0012uf 5% 50V	222122J
	C405,406	2 2 2	M-CAP 0.01uf 5% 50V	222103J
	C407,408	2 2 2	M-CAP 0.0033uf 5% 50V	222332J
	C409,410	2 2 2	M-CAP 0.047uf 5% 50V	222473J
	C411,412	2 2 2	E-CAP 220uf 6.3V	211042S
	C413,414	2 2 2	BP-CAP 2.2uf 50V	215512N
	C415,416	2 2 2	M-CAP 0.0047uf 5% 50V	222472J
	C417,418	2 2 2	E-CAP 33uf 25V	211323S
	R401,402	2 2 2	RES 100ohm 5% 1/4W	328101J
	R403,404	2 2 2	RES 5.6ohm 5% 1/4W	328568J

REF.	SYMBOL	TYPE <sup>+</sup>	DESCRIPTION <sup>++</sup>	PART	PAR
No.	No.	W E V		No.	No.
	R405,406	2 2 2	RES 47kohm 5% 1/4W	328473J	32833J
	R407~410	10 10 10	RES 5.6kohm 5% 1/4W	328562J	32882J
	R411,412	2 2 2	RES 27kohm 5% 1/4W	328273J	32812J
	R413,414	2 2 2	RES 150ohm 5% 1/4W	328151J	32856J
	R415~418	4 4 4	RES 5.6kohm 5% 1/4W	328562J	32810J
	R419,420	2 2 2	RES 68kohm 5% 1/4W	328683J	
	R421~424	4 4 4	RES 120ohm 5% 1/4W	328121J	
	R425,426	2 2 2	RES 12ohm 5% 1/4W	328120J	
	R427,428	2 2 2	RES 560ohm 5% 1/4W	328561J	
	R429,430	2 2 2	RES 100kohm 5% 1/4W	328104J	31822J
<b>(MUTING SECTION)</b>					
	C701,702	2 2 2	C-CAP 47pf 10% 50V SL	232470K	31313J
					31112J
	R701,702	2 2 2	RES 1kohm 5% 1/4W	328102J	36006J
	R703,704	2 2 2	RES 27kohm 5% 1/4W	328273J	30211J
	R705,706	2 2 2	RES 3.3kohm 5% 1/4W	328332J	
<b>(VOLUME CONTROL SECTION)</b>					
408	VR1	1 1 1	VR 100kohm (B) x 2	4390180	33810J
409	VR2	1 1 1	VR 250kohm (MN)	4321440	31143J
					31141J
	C703~706	4 4 4	M-CAP 0.047uf 5% 50V	222473J	31132J
					31133J
	R707,708	2 2 2	RES 12kohm 5% 1/4W	328123J	31122J
	R709,710	2 2 2	RES 8.2kohm 5% 1/4W	328822J	32833J
	R711,712	2 2 2	RES 150kohm 5% 1/4W	328154J	32833J
					32815J
					36218J
<b>(HEADPHONE AMP SECTION)</b>					
*410		1 1 1	Jack, headphones	4550360	
	IC601	1 1 1	IC LA4170	518089S	33108J
	C601,602	2 2 2	E-CAP 0.47uf 50V	211505S	
	C603,604	2 2 2	E-CAP 220uf 16V	211232S	30608J
	C605,606	2 2 2	M-CAP 0.033uf 5% 50V	222333J	
	C607,608	2 2 2	E-CAP 22uf 16V	211222S	32818J
	C609	1 1 1	E-CAP 100uf 16V	211230S	
	R601,602	2 2 2	RES 120kohm 5% 1/4W	328124J	
	R603,604	2 2 2	RES 39kohm 5% 1/4W	328393J	
	R605,606	2 2 2	RES 39ohm 5% 1/4W	328390J	
	R607,608	2 2 2	RES 1kohm 5% 1/4W	328102J	
<b>(RELAY DRIVE SECTION)</b>					
411	RELAY1	1 1 1	Relay - FBR221D012	1700490	30425J
	Q803	1 1 1	TR 2SC2240 (GR or BL)	512102S	30425J
	D803,804	2 2 2	Diode GP10-4002	560066S	30607J
	D805,806	2 2 2	Diode DS446	501028S	30607J
	ZD802	1 1 1	Zener diode RD7.5EB1	502062S	32818J
					32847J
	C813	1 1 1	E-CAP 47uf 25V	211325S	
	C814	1 1 1	E-CAP 220uf 10V	211132S	
	C815	1 1 1	M-CAP 0.001uf 5% 50V	222102J	
	R806,807	2 2 2	RES 22kohm 5% 1/4W	328223J	
	R808	1 1 1	FP-RES 10ohm 5% 1/4W	328100L	
<b>(REGULATOR SECTION)</b>					
	IC801	1 1 1	IC M5230L	518221S	
	Q801	1 1 1	TR 2SD794 (Q or P)	513131S	
	Q802	1 1 1	TR 2SB744 (Q or P)	511127S	
	D801,802	2 2 2	Diode W02	560061S	
	ZD801	1 1 1	Zener diode RD3.9EB22	502061S	

PARTS ORDERING PROCEDURE ----- DO NOT USE THE "REFERENCE" number and "SYMBOL" number. (these are control # for the factory only). Include in any order: a. Part number b. Part description c. Model number. (any of the above lacking from an order may delay shipment of that order.)

REF	SYMBOL	TYPE <sup>+</sup>	DESCRIPTION <sup>++</sup>	PART
No.	No.	W E V		No.
	C801,802	2 2 2	C-CAP 0.01uf 500V	238103P
	C803,804	2 2 2	E-CAP 470uf 35V	211435S
	C805,806	2 2 2	E-CAP 4.7uf 35V	211415S
	C807	1 1 1	E-CAP 10uf 25V	211320S
	C808	1 1 1	M-CAP 0.001uf 5% 50V	222102J
	C809,810	2 2 2	E-CAP 10uf 25V	211320S
	C811	1 1 1	E-CAP 470uf 25V	211335S
	C812	1 1 1	E-CAP 10uf 16V	211220S
	R801	1 1 1	RES 33kohm 5% 1/4W	328333J
	R802	1 1 1	RES 3.3kohm 5% 1/4W	328332J
	R803,804	2 2 2	RES 15kohm 5% 1/4W	328153J
	R805	1 1 1	FP-MO-RES 470ohm 5% 1W	361471L
<b>BETA 30/s: SELECTOR PWB ASSEMBLY</b>				
501	S2~S9	2 2 2	Switch, tetra push — input selector	4042540
502	S10~S12	1 1 1	Switch, tri push — line out selector	4042560
503	S13~S15	1 1 1	Switch, tri push — sound processor	4042550
505	LD201,202	2 2 2	LED GL-5ND5 — red and green	5060790
506	LD203,204	2 2 2	LD LN31GCPH — green	5060730
	R201	1 1 1	RES 180ohm 5% 1/4W	328181J
	R202	1 1 1	RES 470ohm 5% 1/4W	328471J
<b>BETA 50/s: PREAMPLIFIER PWB ASSEMBLY</b>				
<b>(TONE CONTROL SECTION)</b>				
401	VR3, 4	2 2 2	VR 100kohm (C) x 2 — bass/treble	4321430
	IC501	1 1 1	IC NJM2043D	518220S
	C501,502	2 2 2	E-CAP 3.3uf 50V	211513S
	C503,504	2 2 2	C-CAP 47pf 10% 50V SL	232470K
	C505,506	2 2 2	C-CAP 5pf ± 0.5pf 50V SL	232509D
	C507~510	4 4 4	BP-CAP 1uf 50V	215510N
	C511,512	2 2 2	M-CAP 0.027uf 5% 50V	222273J
	C513,514	2 2 2	M-CAP 0.15uf 5% 50V	222154J
	C515,516	2 2 2	M-CAP 0.0012uf 5% 50V	222122J
	C517,518	2 2 2	M-CAP 0.0068uf 5% 50V	222682J
	C519,520	2 2 2	BP-CAP 3.3uf 50V	215513N
	R501,502	2 2 2	RES 15kohm 5% 1/4W	328153J
	R503,504	2 2 2	RES 3.9kohm 5% 1/4W	328392J
	R505,506	2 2 2	RES 330kohm 5% 1/4W	328334J
	R507,508	2 2 2	RES 56kohm 5% 1/4W	328563J
	R509,510	2 2 2	RES 18kohm 5% 1/4W	328183J
	R511,512	2 2 2	RES 3.3kohm 5% 1/4W	328332J
	R513,514	2 2 2	RES 12kohm 5% 1/4W	328123J
	R515,516	2 2 2	RES 18kohm 5% 1/4W	328183J
	R517,518	2 2 2	RES 3.3kohm 5% 1/4W	328332J
	R519,520	2 2 2	RES 4.7kohm 5% 1/4W	328472J
	R521,522	2 2 2	RES 22kohm 5% 1/4W	328223J
	R523,524	2 2 2	RES 330kohm 5% 1/4W	328334J
<b>(PUSH SWITCH SECTION)</b>				
402	S1	1 1 1	Switch, mono push — cartridge selector	4042600
404	S25,26	1 1 1	Switch, twin push — line mix/muting	4042530
405	S27,28	2 2 2	Switch, mono push — mode/subsonic	4042590
<b>(TERMINAL SECTION)</b>				
406		1 1 1	Terminal, RCA phono pin jack — 2P x 3	4446050
407		5 5 5	Terminal, RCA phono pin jack — 2P x 2	4444120
	R101~106	6 6 6	RES 1meg.ohm 5% 1/4W	328105J
	R107,108	2 2 2	RES 2.2kohm 5% 1/4W	328222J
	R109,110	2 2 2	RES 1meg.ohm 5% 1/4W	328105J

REF	SYMBOL	TYPE <sup>+</sup>	DESCRIPTION <sup>++</sup>	PART
No.	No.	W E V		No.
	R111,112	2 2 2	RES 2.2kohm 5% 1/4W	328222J
	R113~120	8 8 8	RES 1meg.ohm 5% 1/4W	328105J
<b>(EQ AMP SECTION)</b>				
	IC401	1 1 1	IC NJM2043D	518220S
	Q401~404	4 4 4	FET 2SK170 (GR or BL)	516039S
	C101	1 1 1	C-CAP 0.01uf +80, -20% 50V YG	231103Z
	C401,402	2 2 2	C-CAP 100pf 10% 50V SL	232101K
	C403,404	2 2 2	M-CAP 0.0012uf 5% 50V	222122J
	C405,406	2 2 2	M-CAP 0.01uf 5% 50V	222103J
	C407,408	2 2 2	M-CAP 0.0033uf 5% 50V	222332J
	C409,410	2 2 2	M-CAP 0.047uf 5% 50V	222473J
	C411,412	2 2 2	E-CAP 2200uf 6.3V	211042S
	C413,414	2 2 2	M-CAP 2.2uf 10% 250V	285225K
	C415,416	2 2 2	M-CAP 0.0047uf 5% 50V	222472J
	C417,418	2 2 2	E-CAP 33uf 25V	211323S
	R401,402	2 2 2	RES 100ohm 5% 1/4W	328101J
	R403,404	2 2 2	RES 5.6ohm 5% 1/4W	328568J
	R405,406	2 2 2	RES 47kohm 5% 1/4W	328473J
	R407~410	4 4 4	RES 5.6kohm 5% 1/4W	328562J
	R411,412	2 2 2	RES 27kohm 5% 1/4W	328273J
	R413,414	2 2 2	RES 150ohm 5% 1/4W	328151J
	R415~418	4 4 4	RES 5.6kohm 5% 1/4W	328562J
	R419,420	2 2 2	RES 68kohm 5% 1/4W	328683J
	R421~424	4 4 4	RES 120ohm 5% 1/4W	328121J
	R425,426	2 2 2	RES 12ohm 5% 1/4W	328120J
	R427,428	2 2 2	RES 560ohm 5% 1/4W	328561J
	R429,430	2 2 2	RES 100kohm 5% 1/4W	328104J
<b>(MUTING SECTION)</b>				
	C701,702	2 2 2	C-CAP 47pf 10% 50V SL	232470K
	R701,702	2 2 2	RES 1kohm 5% 1/4W	328102J
	R703,704	2 2 2	RES 27kohm 5% 1/4W	328273J
	R705,706	2 2 2	RES 3.3kohm 5% 1/4W	328332J
<b>(FLAT AMP SECTION)</b>				
408	VR1	1 1 1	VR 100kohm (B) x 2	4390180
409	VR2	1 1 1	VR 250kohm (MN)	4321440
	IC701	1 1 1	IC NJM2043D	518220S
	Q701~704	4 4 4	FET 2SK117 (GR)	516048S
	C703~706	4 4 4	M-CAP 0.047uf 5% 50V	222473J
	C707,708	2 2 2	C-CAP 47pf 10% 50V SL	232470K
	C709,710	2 2 2	M-CAP 0.001uf 5% 50V	222102J
	C711,712	2 2 2	M-CAP 2.2uf 10% 250V	285225K
	C713,714	2 2 2	M-CAP 0.0018uf 5% 50V	222182J
	R709,710	2 2 2	RES 8.2kohm 5% 1/4W	328822J
	R711,712	2 2 2	RES 150kohm 5% 1/4W	328154J
	R713,714	2 2 2	RES 1kohm 5% 1/4W	328102J
	R715,716	2 2 2	RES 330kohm 5% 1/4W	328334J
	R717~720	4 4 4	RES 5.6kohm 5% 1/4W	328562J
	R721,722	2 2 2	RES 27kohm 5% 1/4W	328273J
	R723,724	2 2 2	RES 1kohm 5% 1/4W	328102J
	R725,726	2 2 2	RES 5.6kohm 5% 1/4W	328562J
	R729,730	2 2 2	RES 33kohm 5% 1/4W	328333J
	R731,732	2 2 2	RES 5.6kohm 5% 1/4W	328562J
	R733,734	2 2 2	RES 560ohm 5% 1/4W	328683J
	R735,736	2 2 2	RES 68kohm 5% 1/4W	328683J
	R737~740	4 4 4	RES 56ohm 5% 1/4W	328560J

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REF.	SYMBOL	TYPE <sup>+</sup>	DESCRIPTION <sup>++</sup>				PART
No.	No.	W E V					No.
(CX NR SECTION)							
	IC901	1 1 1	IC	HA-12044			518224S
	Q804	1 1 1	TR	2SC1815 (Y or GR)			512107S
	Q805	1 1 1	TR	2SA1015 (Y)			510102S
	ZD803,804	2 2 2	Zener diode	RD9.1EB2			502055S
	C816,817	2 2 2	E-CAP	22uf	10V		211122S
	C818,819	2 2 2	E-CAP	100uf	10V		211130S
	C901,902	2 2 2	E-CAP	10uf	16V		211220S
	C903,904	2 2 2	C-CAP	150pf	10%	50V SL	232151K
	C905,906	2 2 2	E-CAP	2.2uf	50V		211512S
	C907,908	2 2 2	M-CAP	0.068uf	5%	50V	222683J
	C909	1 1 1	E-CAP	0.47uf	50V		211505S
	C910	1 1 1	E-CAP	22uf	10V		211122S
	C911	1 1 1	M-CAP	0.1uf	5%	50V	222104J
	R809,812	2 2 2	FP-RES	220ohm	5%	1/4W	328221L
	R810,811	2 2 2	RES	2.7kohm	5%	1/4W	328272J
	R905,906	2 2 2	RES	470ohm	5%	1/4W	328471J
	R907,908	2 2 2	RES	47kohm	5%	1/4W	328473J
	R909~912	4 4 4	RES	100kohm	5%	1/4W	328104J
	R913,914	2 2 2	RES	470ohm	5%	1/4W	328471J
	R915~918	4 4 4	RES	47kohm	5%	1/4W	328473J
	R919,920	2 2 2	RES	150kohm	5%	1/4W	328154J
	R921,922	2 2 2	RES	180kohm	5%	1/4W	328184J
	R923	1 1 1	RES	68kohm	5%	1/4W	328683J
	R924	1 1 1	RES	6.8kohm	5%	1/4W	328682J
	R925	1 1 1	RES	330ohm	5%	1/4W	328331J
(HEADPHONE AMP SECTION)							
*410		1 1 1	Jack, headphones				4550360
	IC601	1 1 1	IC	LA4170			518089S
	C601,602	2 2 2	E-CAP	0.47uf	50V		211505S
	C603,604	2 2 2	E-CAP	220uf	16V		211232S
	C605,606	2 2 2	M-CAP	0.033uf	5%	50V	222333J
	C607,608	2 2 2	E-CAP	22uf	16V		211222S
	C609	1 1 1	E-CAP	100uf	16V		211230S
(RELAY DRIVE SECTION)							
411	RELAY1	1 1 1	Relay -	FBR221D012			1700490
	Q803	1 1 1	TR	2SC2240 (GR or BL)			512102S
	D803,804	2 2 2	Diode	GP10-4002			560066S
	D805,806	2 2 2	Diode	DS446			501028S
	ZD802	1 1 1	Zener diode	RD7.5EB1			502062S
	C813	1 1 1	E-CAP	100uf	25V		211330S
	C814	1 1 1	E-CAP	220uf	10V		211132S
	C815	1 1 1	M-CAP	0.001uf	5%	50V	222102J
	R806,807	2 2 2	RES	22kohm	5%	1/4W	328223J
	R808	1 1 1	FP-RES	33ohm	5%	1/4W	328330L
(MIXING AMP SECTION)							
412	VR5	1 1 1	VR	100kohm (B) x 2			4321450
	IC301	1 1 1	IC	NJM2043D			518220S
	C301,302	2 2 2	E-CAP	1uf	50V		211510S
	C303,304	2 2 2	BP-CAP	1uf	50V		215510N
	C305,306	2 2 2	M-CAP	0.0047uf	5%	50V	222472J
	C307,308	2 2 2	E-CAP	33uf	25V		211323S
	C309,310	2 2 2	C-CAP	5pf ± 0.5pf	50V	SL	232509D

REF.	SYMBOL	TYPE <sup>+</sup>	DESCRIPTION <sup>++</sup>		PART
No.	No.	W E V			No.
	R301~304	4 4 4 RES	33kohm 5% 1/4W		328333J
	R305~308	4 4 4 RES	82kohm 5% 1/4W		328823J
	R309,310	2 2 2 RES	120kohm 5% 1/4W		328124J
	R311,312	2 2 2 RES	560ohm 5% 1/4W		328561J
	R313,314	2 2 2 RES	100kohm 5% 1/4W		328104J
<b>(REGULATOR SECTION)</b>					
	IC801	1 1 1 IC	M5230L		518221S
	Q801	1 1 1 TR	2SD794 (Q or P)		513131S
	Q802	1 1 1 TR	2SB744 (Q or P)		511127S
	D801,802	2 2 2	Diode W02		560061S
	ZD801	1 1 1	Zener diode RD3.9FB2		502113S
	C801,802	2 2 2 C-CAP	0.01uf 500V		238103P
	C803,804	2 2 2 E-CAP	470uf 35V		211435S
	C805,806	2 2 2 E-CAP	4.7uf 35V		211415S
	C807	1 1 1 E-CAP	10uf 25V		211320S
	C808	1 1 1 M-CAP	0.001uf 5% 50V		222102J
	C809,810	2 2 2 E-CAP	10uf 25V		211320S
	C811	1 1 1 E-CAP	470uf 25V		211335S
	C812	1 1 1 E-CAP	10uf 16V		211220S
	R801	1 1 1 RES	33kohm 5% 1/4W		328333J
	R802	1 1 1 RES	3.3kohm 5% 1/4W		328332J
	R803,804	2 2 2 RES	15kohm 5% 1/4W		328153J
	R805	1 1 1 FP-MO-RES	180ohm 5% 2W		362181L
<b>(CX CALIBRATOR SECTION)</b>					
	VR6,7	2 2 2 VR	50kohm (A)		4310810
	LED901	1 1 1 LED	PRG5114S - red and green		5060800
	R903,904	2 2 2 RES	18kohm 5% 1/4W		328183J
<b>BETA 50/s: SELECTOR PWB ASSEMBLY</b>					
501	S2~S9	2 2 2	Switch, tetra push - input selector		4042540
502	S10~S12	1 1 1	Switch, tri push - line out selector		4042560
503	S13~S15	1 1 1	Switch, tri push - CX-NR		4042550
504	S16~S24	3 3 3	Switch, tri push - sound processor/tone		4042570
505	LD201,202	2 2 2	LED GL-5ND5 - red and green		5060790
506	LD203~210	8 8 8	LED LN31GCPH - green		5060730
	R201	1 1 1 RES	180ohm 5% 1/4W		328181J
	R202~205	4 4 4 RES	470ohm 5% 1/4W		328471J

# SEMICONDUCTOR DATA

## TRANSISTORS

† NOTES

Ge : Germanium  
Si : Silicon

A : Alloy  
B : Base  
D : Diffused  
Dd : Double-diffused

Df : Drift-field  
E : Epitaxial  
G : Grown  
J : Junction

M : Mesa  
P : Planar  
Pc : Point-contact  
Td : Triple-diffused

DEVICE TYPE	APPLICATIONS	STRUC- TURE†	MAXIMUM RATINGS Absolute-Maximum Values: (T <sub>A</sub> = 25°C unless otherwise specified)					ELECTRICAL CHARACTERISTICS Typical Values: (T <sub>A</sub> = 25°C unless otherwise specified)														MANU- FACTURER
			Collector- to-Base Voltage V <sub>CB0</sub> (V)	Emitter- to-Base Voltage V <sub>EB0</sub> (V)	Collector Current I <sub>C</sub> (mA)	Collector Dissipa- tion P <sub>C</sub> (mW)	Junction Tempera- ture T <sub>J</sub> (°C)	Collector Cutoff Current I <sub>CBO</sub> (μA)	V <sub>CB</sub> (V)	hFE	V <sub>CE</sub> (V)	I <sub>C</sub> (mA)	Collector-Emitter Saturation Voltage V <sub>CE(sat)</sub> (V)	I <sub>C</sub> (mA)	I <sub>B</sub> (mA)	Gain-Bandwidth Product f <sub>T</sub> (MHz)	V <sub>CE</sub> * V <sub>CB</sub> * (V)	I <sub>E</sub> * I <sub>C</sub> * (mA)	Output Capacitance C <sub>ob</sub> (pF)	Others		
2SA1015 (Y)	AF, General	PNP Si-E	-50	-5	-150	400	125	-0.1 max.	-50	120 ~ 240	-6	-2	-0.3 max.	-100	-10	80 min.	-10	-1*	7 max.		TOSHIBA	
2SB744 (P, Q)	AF, Power amp.	PNP Si-E	-70	-5	-3A	1W	150	-1 max.	-45	100 ~ 320	-5	-500	-2 max.	-1.5A	-150	45 min.	-5	-100*	60		NEC	
2SC1815 (Y, GR)	AF, General	NPN Si-E	80	5	150	400	125	0.1 max.	80	120 ~ 400	6	2	0.25 max.	100	10	80 min.	10	1*	3 max.		TOSHIBA	
2SC2240 (GR, BL)	AF, Low noise	NPN Si-E	120	5	100	300	125	0.01 max.	120	200 ~ 700	6	2	0.3 max.	10	1	100 min.	6	1*	3		TOSHIBA	
2SD794 (P, Q)	AF, Power amp.	NPN Si-E	70	5	3A	1W	150	1 max.	45	100 ~ 320	5	500	2 max.	1.5A	150	80 min.	5	100*	40		NEC	

## FIELD EFFECT TRANSISTORS

DEVICE TYPE	APPLICA- TIONS	STRUC- TURE†	MAXIMUM RATINGS Absolute-Maximum Values: (T <sub>A</sub> = 25° C unless otherwise specified)						ELECTRICAL CHARACTERISTICS Typical Values: (T <sub>A</sub> = 25° C unless otherwise specified)														MANU- FACTURER		
			Gate-to-Drain Voltage	Gate-to-Source Voltage	Gate Current	Drain Current	Total Dissipation	Channel Temperature	Gate Leak Current		Gate to Drain Breakdown Voltage		Drain Current		Gate to Source Cutoff Voltage		Forward Transfer Admittance		Feed Back Capacitance		Power Gain (Common Source)			Noise Figure	
			V <sub>GD0</sub> (V)	V <sub>GS0</sub> (V)	I <sub>G</sub> (mA)	I <sub>D</sub> (mA)	P <sub>D</sub> (mW)	T <sub>ch</sub> (°C)																	
			Test Conditions	IGSS (nA)	Test Conditions	V <sub>BRD</sub> GDD (V)	Test Conditions	IDSS (mA)	Test Conditions	V <sub>GS</sub> loff (V)	Test Conditions	M <sub>fs</sub> (mS)	Test Conditions	C <sub>rss</sub> (pF)	Test Conditions	GPS (dB)	Test Conditions	NF (dB)							
2SK117 (GR)	AF, Low noise	Si N-channel Junction	-50		10	300	125	V <sub>GS</sub> = -30V V <sub>DS</sub> = 0	-1 max.	V <sub>DS</sub> = 0 I <sub>G</sub> = -100μA	-50 min.	V <sub>GS</sub> = 10V V <sub>DS</sub> = 0	2.6 / 6.5		V <sub>DS</sub> = 10V V <sub>GS</sub> = 0 f = 1kHz	15	V <sub>DS</sub> = 10V I <sub>D</sub> = 0 f = 1MHz	3				V <sub>DS</sub> = 10V R <sub>g</sub> = 1kΩ I <sub>D</sub> = 0.5mA f = 1kHz	1	TOSHIBA	
2SK170 (GR, BL)	AF, Low noise	Si N-channel Junction	-40		10	400	125	V <sub>GS</sub> = -30V V <sub>DS</sub> = 0	-1 max.	V <sub>DS</sub> = 0 I <sub>G</sub> = -100μA	-40 min.	V <sub>DS</sub> = 10V V <sub>GS</sub> = 0	2.6 / 12		V <sub>DS</sub> = 10V V <sub>GS</sub> = 0 f = 1kHz	22	V <sub>DS</sub> = 10V I <sub>D</sub> = 0 f = 1MHz	6				V <sub>DS</sub> = 10V R <sub>g</sub> = 1kΩ I <sub>D</sub> = 1mA f = 1kHz	0.5	TOSHIBA	

## DIODES, LEDS

DEVICE TYPE	APPLICATIONS	STRUCTURE†	MAXIMUM RATINGS Absolute - Maximum Values: (T <sub>A</sub> = 25° C unless otherwise specified)									ELECTRICAL CHARACTERISTICS Typical Values: (T <sub>A</sub> = 25° C unless otherwise specified)							Others	MANUFACTURER
			Reverse Surge Voltage	Peak Reverse Voltage	Reverse Voltage	Peak Forward Voltage	Peak Forward Current	Average Rectified Current	Forward Surge Current	Junction Temperature	Total Power Dissipation	Forward Current	Forward Voltage	Reverse Current	Test Condition					
			V <sub>RS</sub> (V)	V <sub>RM</sub> (V)	V <sub>R</sub> (V)	V <sub>FM</sub> (V)	I <sub>FM</sub> (mA)	I <sub>O</sub> (mA)	I <sub>F</sub> surge (A)	T <sub>J</sub> (°C)	P <sub>D</sub> (mW)	I <sub>Fmin</sub> (mA)	Test Condition V <sub>F</sub> (V)	V <sub>RM</sub> (V)		I <sub>FR</sub> (μA)	Test Condition V <sub>R</sub> (V)			
DS446	Switching	Si-EP		105	100		500	200	0.7	175				0.65	1.5	0.1	100		SANYO	
GP10-4002	Rectifier	Si-DJ		100				1A	30	175				1.1	1A	5			GENERAL INSTRUMENT	
W02	Rectifier	Si-DJ (Bridge)	200	200		140		1.5A	50	150				1	1A	10			GENERAL INSTRUMENT	
LN31G-CPH	Indicator (green)	GaP			4		40			85	90		2.8	20	10	4			MATSUSHITA	
GL-5ND5	Indicator (red/green)	GaP/GaAsP	(red)	(green)			50			85	70		2.4	20	10	4			SHARP	
PRG-5114S	Indicator (red/green)	GaP/GaP	(red)	(green)			100			85	75		2.5	10					STANLEY	

## ZENER DIODES

DEVICE TYPE	APPLICATIONS	STRUCTURE†	MAXIMUM RATINGS			ELECTRICAL CHARACTERISTICS Typical Values: (T <sub>A</sub> = 25°C unless otherwise specified)														MANUFACTURER	
			Absolute - Maximum Values: (T <sub>A</sub> = 25°C unless otherwise specified)																		
			Total Power Dissipation	Zener Current	Junction Temperature	Zener Voltage			Differential Resistance		Temperature Coefficient		Reverse Current		Others						
						V <sub>Z</sub>	Test Conditions	r <sub>Z</sub>	Test Conditions	γ <sub>Z</sub>	Test Conditions	I <sub>Z</sub>	Test Conditions								
														MIN		TYP	MAX	I <sub>Z</sub> (mA)	TYP (Ω)		MAX (Ω)
RD3.9-EB2	Regulator	Si-J	400		175	3.89		4.16	20		50	20					10	1			NEC
RD7.5-EB1	Regulator	Si-J	400		175	6.85		7.22	20		10	20					2	4			NEC
RD9.1-EB2	Regulator	Si-J	400		175	8.57		9.01	20		10	20					2	6			NEC
RD3.9-FB2	Regulator	Si-J	1000		175	3.86		4.15	40		15	40					40	1			NEC

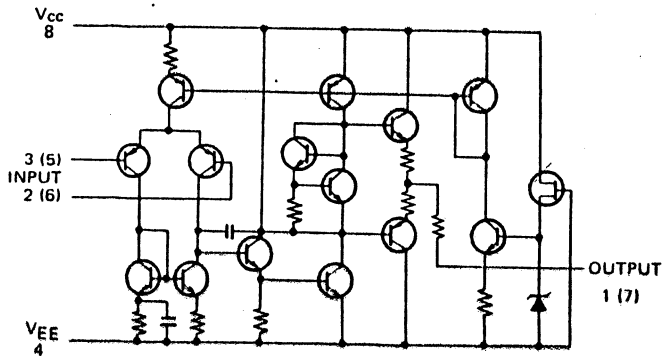


## INTEGRATED CIRCUIT NJM2043D

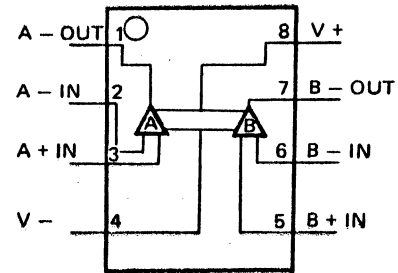
FUNCTION/MANUFACTURER

- Dual Pre-amplifier/JRC

### EQUIVALENT CIRCUIT



### CONNECTION INFORMATION (TOP VIEW)

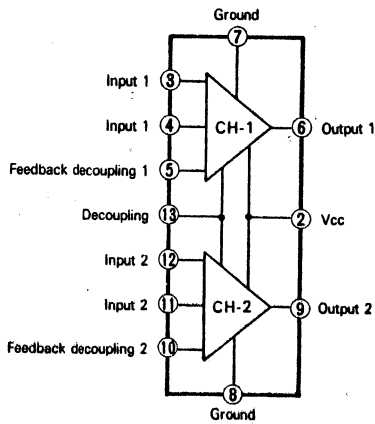


## INTEGRATED CIRCUIT LA4170

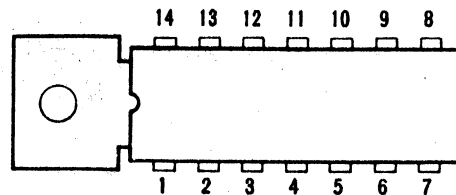
FUNCTION/MANUFACTURER

- Dual Headphone Amplifier/Sanyo

### BLOCK DIAGRAM



### CONNECTION INFORMATION (TOP VIEW)

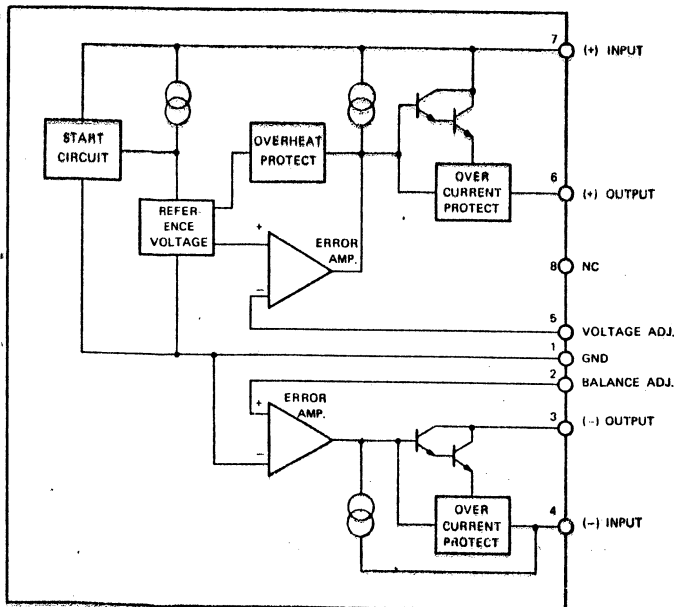


## INTEGRATED CIRCUIT M5230L

FUNCTION/MANUFACTURER

- Voltage Regulator/Mitsubishi

### BLOCK DIAGRAM



### CONNECTION INFORMATION (SIDE VIEW)

